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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/692,007	10/19/2000	Stephen P. DeOrnellas	TEGL1082US1 SRM	7175

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EXAMINER
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UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 01/23/2003

15

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application N .

09/692,007

Applicant(s)

DEORNELLAS ET AL

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

**P r i d f r Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Pri rity under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fullowan et al. (US 5,176,792) in view of Moslehi (US 5,192,849).

Fullowan teaches a method for etching a pattern on a workpiece including the steps of:

selecting a workpiece with a hard mask deposited over a (tungsten) layer to be etched, which hard mask is comprised of a (titanium mask **12**) reactive metal (column 1, lines 51-54 and column 2, lines 39-44). Since Fullowan uses the same hard mask material as that of the present invention, then using Fullowan's hard mask layer would inherently result in said hard mask having a low reactivity to the etch chemistry of an etch process, **as in claim 13** and said hard mask has a low sputter yield and a low reactivity to etch chemistry of an etch process, **as in claims 22 and 28**;

plasma etching the mask workpiece to selectively remove the unmasked tungsten and performing the etching in a plasma etcher that is water-cooled to room temperature (column 2, lines 55-61), reads on,

processing the workpiece in a reactor using an etch step and exposing the hard mask to the etch.

Fullowan differs in failing to teach providing energy to the reactor in order to increase the rate of oxidation of the hard mask in order to slow down the rate of erosion of the hardmask, **in claims 10, 13, 22, 25, 26, 28, 29, 30, 34.**

Moslehi teaches conventional RF plasma chucks can usually operate in the range of 0°C to 200°C (column 3, lines 8-11); the chuck can experience temperatures operating in the range of -150°C to 750°C (column 6, lines 48-51); the RF chuck is compatible with single-wafer plasma processing reactors and has the advantage of improving the etch rate in reactive-ion etching of polysilicon, aluminum, oxides, and polyimides (column 5, lines 12-14 and 22-26). Since Moslehi operates a chuck that is used in reactive ion etching the same material (i.e. aluminum) as a hard mask as claimed in the present invention and at temperatures that overlap that of the present invention, then using Moslehi method of operating a RF plasma chuck reads on providing energy to the reactor and would inherently increase a rate of oxidation of the hard mask in order to slow down the rate of erosion of the hard mask.

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Fullowan by using Moslehi's method of providing energy to the reactor for the purpose of improving reactive ion etch rate of the material being etched (Moslehi, column 5, lines 22-29).

***R s p o n s   t o   A r g u m e n t s***

3. Applicant's arguments filed November 26, 2002 have been fully considered but they are not persuasive. Applicant traverses the 103 rejection of claims 10-49 over Fullowan (US 5,176,792) in view of Moslehi (US 5,192,849). Applicant argues that since Fullowan teaches depositing titanium, etched from the hard mask, onto the sidewalls being etched in the underlying tungsten material, in order to obtain vertical sidewalls and virtually no undercut (column 3, lines 4-11) and it would not be desirable to slow the etch rate of the mask, as a decrease in titanium can have a corresponding increase in undercutting of tungsten (col. 3, lines 1-40), then Fullowan teaches away from "slowing the rate of erosion of the hard mask" as in claim 10.

Applicant's arguments are unpersuasive because Moslehi is relied upon to teach the deficiency of Fullowan and since Moslehi operates a chuck that is used in reactive ion etching the same material (i.e. aluminum) as a hard mask as claimed in the present invention and at temperatures that overlap that of the present invention, then using Moslehi method of operating a RF plasma chuck reads on providing energy to the reactor and would inherently increase a rate of oxidation of the hard mask in order to slow down the rate of erosion of the hard mask.

Applicant traverses the motivation for combining the references. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed

invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the reason to combine Fullowan in view of Moslehi would be for the purpose of improving reactive ion etch rate of the material being etched (Moslehi, column 5, lines 22-29).

### ***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

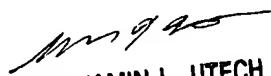
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone

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number is 703-306-9074. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-972-9310 for regular communications and 703-872-9311 for After Final communications.

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

ltue  
January 17, 2003